Volunteer Lake Assessment Program Individual Lake Reports

MILLEN POND, WASHINGTON, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	832	**Max. Depth (m):**	12.6	**Flushing Rate (yr^{-1}):**	0.7
Surface Area (Ac.):	156	**Mean Depth (m):**	5	**P Retention Coef:**	0.71
Shore Length (m):	5,000	**Volume (m^3):**	3,185,500	**Elevation (ft):**	1582

TROPHIC CLASSIFICATION

Year	Trophic class
1984	OLIGOTROPHIC
1997	OLIGOTROPHIC

KNOWN EXOTIC SPECIES

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

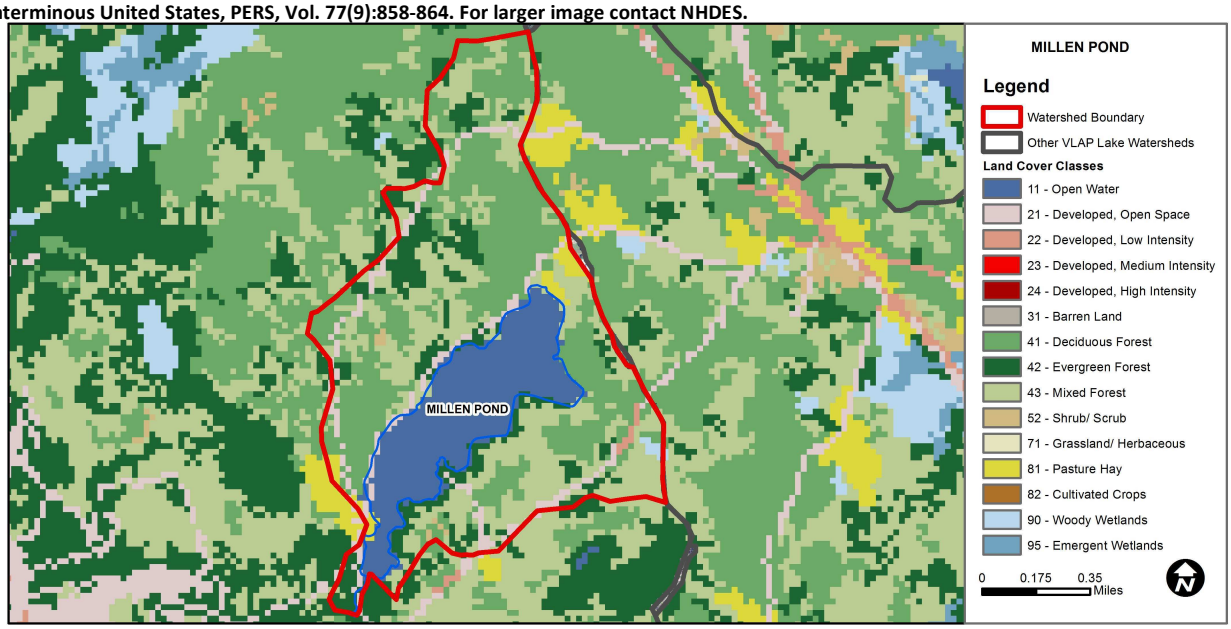
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator and the chlorophyll a indicator is okay.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Slightly Bad	There are >10% of samples (minimum of 2), exceeding criteria.
	Chlorophyll-a	Good	The calculated median is from 5 or more samples and is < indicator and > 1/2 indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

MILLEN POND - TOWN BEACH	Escherichia coli	Good	There are geometric means and all geometric means are < geometric mean criteria; and there has been a single sample exceedance.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	19.5	Barren Land	0	Grassland/Herbaceous	0
Developed-Open Space	5.73	Deciduous Forest	32.21	Pasture Hay	1.71
Developed-Low Intensity	0.33	Evergreen Forest	12	Cultivated Crops	0
Developed-Medium Intensity	0	Mixed Forest	27.86	Woody Wetlands	0.27
Developed-High Intensity	0	Shrub-Scrub	0.3	Emergent Wetlands	0

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2014 Data Summary

Observations and Recommendations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels decreased slightly from July to August and then increased slightly from August to September. Average chlorophyll levels were low and less than the state median. Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- **Conductivity/Chloride:** Deep spot and tributary conductivity levels remained low in 2014 and were less than the state median. Historical trend analysis indicates significantly decreasing (improving) epilimnetic (upper water layer) conductivity levels since monitoring began. This trend has also been observed in several area lakes.
- **Total Phosphorus:** Deep spot phosphorus levels remained low on each sampling event and were much less than the state median. Historical trend analysis indicates significantly decreasing (improving) epilimnetic phosphorus levels since monitoring began. We hope to see this continue! Tributary phosphorus levels also remained low throughout the summer.
- **Transparency:** Transparency measured without the viewscope (NVS) was good, much better than the state median, and improved from 2013. Although transparency measurements are better than most lakes, historical trend analysis indicates significantly decreasing (worsening) transparency since monitoring began. Transparency measured with the viewscope (VS) was generally much better than that measured without and likely a better representation of conditions.
- **Turbidity:** Epilimnetic and hypolimnetic (lower water layer) turbidities were low. Metalimnetic (middle water layer) turbidity was slightly higher in August likely due to a layer of algae at that depth. Inlet 2 and Outlet turbidities were slightly elevated in September following a storm event and low flow conditions. Laboratory data sheets indicated small amounts of sediment and/or organic debris in the samples.
- **pH:** Deep spot pH levels were less than the desirable range 6.5-8.0 units, however historical trend analysis indicates significantly increasing (improving) epilimnetic pH since monitoring began. We hope to see this continue!
- **Recommended Actions:** Deep spot chlorophyll, phosphorus and transparency trends, although generally improving, have become more variable since 2005. This could be the result of the increased frequency and intensity of significant storm events in the watershed. Continue monthly monitoring to better understand the impacts of these events on the pond system. Educate lake and watershed residents on ways to reduce stormwater runoff from their properties. DES' "NH Homeowner's Guide to Stormwater Management" is a great resource. Keep up the great work!

Station Name	Table 1. 2014 Average Water Quality Data for MILLEN POND							
	Alk. mg/l	Chlor-a ug/l	Cond. uS/cm	Total P ug/l	Trans. m		Turb. ntu	pH
					NVS	VS		
Epilimnion	2.1	2.59	27.9	4	5.68	6.56	0.68	6.36
Metalimnion			27.9	6			0.95	6.30
Hypolimnion			29.7	6			0.85	5.99
Inlet			29.6	3			0.96	6.33
Inlet 2			21.0	8			1.26	5.59
Outlet In Stream			31.0	20			1.70	6.28

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Improving	Data significantly decreasing.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Improving	Data significantly increasing.	Transparency	Worsening	Data significantly decreasing.
			Phosphorus (epilimnion)	Improving	Data significantly decreasing.